again to pour ridicule on the reasonably substantiated claims of other workers to have made some slow progress by the application of the experimental method, but who, more modest than himself, still remain *non magistri sed discipuli naturae* in regard to cancer.

(2) Dr. Powell White's volume is in many respects an antithesis to that of Mr. Roger Williams. A pathologist by profession, his aims and methods are entirely different. The volume does not profess to contain the whole pathology of cancer, and it is a model of scientific self-restraint. Unlike Mr. Williams, Dr. White extends a whole-hearted welcome to recent experimental work. In four chapters the author covers in simple language much that is of main interest in the present phase of investigation of cancer, the study of which he rightly insists may not be separated from that of tumours generally. To this end he classifies tumours according to their histological structure and relation to normal tissues, and dismisses a classification based upon embryological conceptions as unscientific and useless. He then proceeds to discuss the rudiment of origin, the mode of growth and extension, the clinical features, and the relations of cancer to organisms attacked. In the latter connection it is pointed out that in studying questions of metabolism in individuals naturally attacked, it is difficult to separate the effects of the cancer *per se* from those due to the disturbance of the organ affected. The author is no doubt aware that when cancer is implanted into normal animals this complication is got rid of, and the effects of cancer *per se* obtained pure. Mr. Roger Williams and Dr. Powell White agree that there does not appear to be any specific cancer toxin, and in conformity with modern conceptions "cachexia," or wasting, is regarded as a secondary accidental consequence, and not as a necessary antecedent or concomitant constitutional condition. Original and suggestive work is recorded on the occurrence of cholesterin, fatty, and other crystals in cancer and in the adrenal cortex, and it is hinted that cholesterin plays some part in the regulation of cell proliferation.

The longest chapter in the book is devoted to causation. The evidence for and against extrinsic and intrinsic causation is discussed. A congenital origin is discarded, and a parasitic causation rejected as being entertained mostly by surgeons and bacteriologists who do not appreciate the pathological and biological difficulties which the hypothesis involves, and because, while its upholders never think it necessary to answer the criticisms against it, they continue to bring forward the same old arguments in its favour. This may be too sweeping a criticism of all the work done on the hypothesis that cancer might be a parasitic disease, for, although negative, this work certainly cleared the air, and those who have participated in it have done perhaps more to prove one another wrong than many pathologists who have persistently played the part of scoffing spectators. Still, we entirely agree with Dr. Powell White that the term parasitism can be applied only to the biological behaviour of the cancer cell itself; any further analogy with the processes of known forms of infective disease is certainly erroneous.

The author considers that extrinsic factors long known to play a part in the causation of cancer are adjuvant, and not essential, factors, and in defining the intrinsic causative factors he comes to the conclusion that a tumour arises from a disturbance of a position of unstable equilibrium between the proliferative forces within the cell and the antagonistic influences of the neighbouring cells. In short, the author seeks his explanation vaguely in the continued removal or diminution of the influences which restrain proliferation, in a disturbance of what is defined as "physiological equilibrium." The phrase physiological equilibrium, when applied to the phenomena of cell life, is, however, just one of those phrases which, while appearing to define something, really defines nothing. It is merely a vague re-statement of the problem, and disregards the fact that the cell is really a very complex mechanism of the component parts of which and their inter-relations we are continually learning more. Dr. White alludes to the progress that is being made by the experimental study of cancer in mice, and incorporates many of the results as bearing upon cancer in man. Now that it is possible to study the life-history of the cancer-cell experimentally, we may hope that ere long Dr. Powell White's vague explanation may be replaced by some more precise definition of the mechanism responsible for the ceaseless proliferation of cancerous cells, in regard to which, and its relations to constitutional conditions of the body, already much that is new is being learned. The volume, which is the outcome of work generously endowed by Mrs. Pilkington and encouraged by Prof. Lorrain Smith, is well illustrated with statistical charts and photomicrographs, and its perusal must prove profitable to all who wish to be brought up to date in the biology of cancer. E. F. B.

MAN'S ANCESTRY.

Unsere Ahrenreihe (Progonotaxis Hominis)—kritische Studien über phyletische Anthropologie (Festschrift zur 350-jährigen Jubelfeier der Thüringer Universität Jena und der damit verbundenen Ubergabe des phyletischen Museums am 30 Juli, 1908). By Ernst Haeckel. Pp. iv+58; 6 plates. (Jena: Gustav Fischer, 1908.) Price 7 marks.

DURING the last four decades Prof. Haeckel has so often sketched a hypothetical genealogical tree representing the series of man's supposed ancestors, stretching right back to the remote Protozoa, that his name as the author of a treatise bearing the title at the head of this column will convey to most readers a very precise idea of the general nature and scope of the work.

The book, in fact, is a new edition of the familiar story of man's "phylogeny," brought up to date by the incorporation of many of the results of recent morphological and anthropological research, such, for example, as Semon's, Schwalbe's and Klaatsch's work. That it is embellished with a rich profusion of characteristic new terms is not surprising, when

we remember that Haeckel has always been pre-eminently the godfather of the nomenclature of phylogeny.

Turning directly to his "phylema primatum," which is the main theme of the work, he believes that even in Cretaceous times there was a succession of small "mallotheria" (primitive placenta-bearing mammals or prochoriata), from the earliest of which the ancestors of the Marsupialia were derived, while the later members of the series became the progenitors of the Prosimiæ—the Lemuravida. The facts elucidated by the study of the comparative anatomy and embryology of the apes favour the hypothesis that the earliest (Oligocene or Miocene) platyrrhine monkeys constitute the connecting link between the Eocene Prosimiæ—Lemuravida—and the catarrhine phylum. He speaks of the phyletic unity of the latter (catarrhine phylum), and looks upon man as its highest branch. His succession of catarrhine ancestors of *Homo sapiens* consists of (1) the oldest cynocephali (Papiomorpha), represented to-day by such forms as the baboon; (2) the later cynocephali (Presbytomorpha), such as Nasalis; (3) the oldest man-like apes, such as the gibbons; (4) the later man-like apes, such as the orang and chimpanzee; (5) ape-men (*Pithecanthropus erectus*); and (6) primitive man (*Homo primigenius*).

He disarms the obvious criticism, which most zoologists will make of such a work as this, by repeating the oft-expressed assurance that his "suggestions regarding the phylogeny of man (and their obvious expression in the form of a genealogical tree) are not to be regarded as dogmatic axioms, but rather as *heuristic hypotheses*, intended merely to point the way in a field of research, which is as difficult and obscure as it is interesting and full of significance."

He has a considerable measure of justification for his claim that, in the great progress of anthropological knowledge in recent times, many statements regarding man's ancestry, which he put forward as little more than mere speculations forty years ago, have now been proved to be demonstrable facts.

The book contains a series of excellent illustrations of a cranium of *Homo sapiens*, compared with those of *Homo palinander* (an aboriginal Australian), a chimpanzee, a gibbon and a mandrill, and also a series of three corresponding stages in the embryonic development of nine different mammals.

G. ELLIOT SMITH.

AN ATLAS OF GEOGRAPHICAL EXERCISES.

Practical Exercises in Physical Geography. By Prof. W. M. Davis. Pp. xii+148; atlas of 45 plates. (Boston and London: Ginn and Co., 1908.) Price 3*s.* 6*d.*

THE laboratory steadily replaces the lecture room. The use of laboratory methods in elementary education has at length affected geography, and the former inadequate school exercises are being replaced by others over which the students must think for themselves. To help this change, Prof. W. M. Davis, the chief American prophet in the reform of geographical teaching, has designed an atlas of geographical exercises, accompanied by an explanatory text-book, and based upon his well-known geographical cycle. The atlas consists of forty-five plates, including at the end a few topographical maps of actual places, the usual charts to show the distribution of temperature, winds, and ocean currents, and six maps that give the outlines of each of the continents except Australia. The rest of the plates are ideal maps and sketches, which show the development of valleys, the growth of coasts and coastal plains, the characters of plateaus, the formation of residual mountains by denudation, and the structure of volcanoes. The sketch-maps all teach their lesson simply; there are not the irrelevant details with which Nature usually confuses her illustrations. A page or two of fancy pictures and maps are now inserted in most elementary atlases, but they merely illustrate geographical terms. Prof. Davis adopts this diagrammatic method for more advanced work, and his series of carefully planned exercises brings into due prominence the fundamental conceptions of physical geography. The maps offer excellent geographical exercises, and should be most useful where adequate time is devoted to geography.

Prof. Davis in his preface compares the use of ordinary maps for the first lessons on physical geography, to teaching elementary arithmetic from the books of a large commercial establishment. But this very comparison suggests a doubt whether these exercises could be widely adopted in British schools. Arithmetic is very unpopular with many school children, because they are not attracted by its logical progress, and they are discouraged by the apparent remoteness of its rules from the affairs of life. The effort is therefore made to teach arithmetic by the use of necessary every-day calculations, of which children can realise the practical value. Prof. Davis's system sacrifices the one advantage which ordinary geography shares with technical over purely academic education. To work through the whole of the exercises given in this book would occupy all the time allowed for geography in many elementary schools. The students would leave well prepared for the intelligent interpretation of maps, but they would not know the ordinary facts of political geography; whereas the study of actual instances, especially of local examples that can be checked by field observations, gives the children a keener interest in their work, an equally sound grasp of principles, and a store of useful facts indelibly impressed upon their minds.

In countries where school time is not used up by Latin and Greek, where modern languages are less important than they are in Europe, and public interest in education is not confined to the question of religious instruction, there may be time for students both to learn the geographical principles from such exercises as those of Prof. Davis, and subsequently to learn the necessary stock of facts. But as education is conducted in this country, the amount of time usually devoted to geography is so small that it is doubtful whether sufficient could be spared for Prof. Davis's exercises, though it is to be hoped that teachers will study them, and thus benefit by the last of his many contributions that have given life to geographical education.

J. W. G.